

ABSTRACT

The present invention relates to an illumination system that use rotatable, polarized illumination optics to detect the direction of highly efficient excitation of 5 fluorescent dyes coupled to a sample, or the absorption transition moment, using information on the direction of maximal fluorescence intensity. The present invention also makes it possible to detect individual dynamic changes in the internal structure or orientation of an entire protein molecule by coupling a single fluorescent dye molecule to the protein molecule. The polarized total internal reflection illumination optical 10 system by rotary annulus light of the present invention is also an illumination optical system in which laser beams are introduced into the objective lens of a microscope at the peripheral region by means of the rotatable illumination direction of the laser beams, and the present invention is designed to illuminate by the evanescent field that contains only transverse components that are perpendicular to the direction of radiation from the 15 optical axis of the objective lens. The present invention is also an illumination optical system in which the direction of vibration of the rotating polarized light, which are not usually visualized, is easily detectable in the visual field of a microscope by providing a index pin in the illumination system, while additionally the rotating speed of the polarized light can be monitored from the rotary drive control system.